

# EHRs: The Challenge of Making Electronic Data Usable and Interoperable

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As recently as 2012, an estimated 63% of physicians were still using the fax machine as a primary means of communication, a statistic that may be mind-boggling to those outside the health care industry. But in today's digital age, with more and more doctors using electronic health records (EHRs), this office dinosaur is finally headed toward extinction—right?

Well, maybe. Despite massive effort and investment in health information systems and technology, and many years of widespread availability, the full promised benefits of EHRs are far from fruition. And the reality is that most physicians still have to fax and mail patient records the way they did a decade ago.

The government's big push toward electronic health information exchange (HIE) began in 2009 with President Barack Obama's signing of the American Recovery and Reinvestment Act, an ambitious economic stimulus plan designed to, among many other things, improve the nation's health care delivery system by digitizing all patient records.<sup>1</sup> This portion of the legislation, called the Health Information Technology for Economic and Clinical Health (HITECH) Act, has provided more than \$35 billion in incentives to promote and expand the adoption and use of EHRs by eligible hospitals and health care professionals.

HITECH's proposed five-year timeline, starting in 2011, included three phase-in stages (Table 1), established by the Centers for Medicare and Medicaid Services (CMS). Each stage has its own set of measures requiring providers to adopt and demonstrate "meaningful use" of EHR technology—that is, use of the technology to improve the quality, safety, and efficiency of patient care.<sup>2</sup>

More than six years later, however, HITECH's success is unclear. Although EHRs have been widely implemented

since the legislation was passed, significant barriers remain, chief among them lack of cooperation among stakeholders, burdensome regulations, and physician burnout tied to the technology.<sup>3</sup>

On the plus side, the EHR adoption rate by hospitals in the United States is nearly perfect, with 96% having a federally tested and certified EHR program—a ninefold increase since 2008.<sup>4</sup>

In addition, almost 80% of office-based physicians have a certified EHR system in place.<sup>5</sup>

But the other key HITECH goal was to achieve interoperability across all settings of care—in other words, to connect EHR systems so that physicians can easily share their patients' records with other providers regardless of the software being used—and this task has proved to be more challenging than anticipated. By 2015, only 12% of physicians were able to successfully complete stage 2 of meaningful use, and only 6% of health care providers could share patient data with other clinicians who use an EHR system different from their own.<sup>6,7</sup>

Misaligned incentives are partly to blame for the lack of interoperability, say critics of HITECH, pointing out that its incentives are largely focused on EHR adoption and not HIE. For instance, stage 1 of meaningful use includes neither any requirements nor vision for interoperability, allowing EHR systems to be designed and adopted in ways that did not take HIE into account. By stage 2 or 3, many providers could not justify the fees required to interface their EHRs with other health care providers. There was also a lack of incentives for vendors to make their systems and applications easily interoperable in the first place.<sup>8,9</sup>

## WHY IS INTEROPERABILITY SO HARD?

Hundreds of government-certified EHR products are in use across the country, each with different clinical terminologies, technical specifications, and functional capabilities. These



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**Table 1 Criteria in the Stages of Meaningful Use<sup>2</sup>**

Stage 1 Data Capture and Sharing	Stage 2 Advance Clinical Processes	Stage 3 Improved Outcomes
<ul style="list-style-type: none"> <li>• Electronically capture health information in a standardized format</li> <li>• Use that information to track key clinical conditions</li> <li>• Communicate that information for care coordination processes</li> <li>• Initiate the reporting of clinical quality measures and public health information</li> <li>• Use information to engage patients and their families in their care</li> </ul>	<ul style="list-style-type: none"> <li>• More rigorous HIE</li> <li>• Increased requirements for e-prescribing and incorporating lab results</li> <li>• Electronic transmission of patient care summaries across multiple settings</li> <li>• More patient-controlled data</li> </ul>	<ul style="list-style-type: none"> <li>• Improve quality, safety, and efficiency, leading to improved health outcomes</li> <li>• Decision support for national high-priority conditions</li> <li>• Patient access to self-management tools</li> <li>• Access to comprehensive patient data through patient-centered HIE</li> <li>• Improve population health</li> </ul>

HIE = health information exchange.

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differences make it difficult to create one standard interoperability format for sharing data. In fact, not even those EHR systems built on the same platform are necessarily interoperable because they are often highly customized to an organization's unique workflow and preferences.

Interoperability itself is complex. The term refers to more than just the ability to exchange information. For two EHR systems to be truly interoperable, they must be able to exchange and then use the data. For this to occur, the message transmitted must contain standardized coded data so that the receiving system can interpret it. However, lack of standardized data is an issue that has plagued the U.S. health care system for decades and now certainly limits the ability to share data electronically for patient care.<sup>10</sup>

Interoperability can be classified into three levels:<sup>11</sup>

- Foundational—One EHR system can receive data from another system but does not need to be able to interpret it.
- Structural—Data can be exchanged between information technology systems and interpreted at the data field level.
- Semantic—This is the highest level of interoperability, where two or more systems can exchange information, and the exchanged information can be used.

### INTEROPERABILITY IS A CULTURAL CHALLENGE, TOO

Perhaps the biggest obstacle facing EHR interoperability is not technological but cultural. As in other industries, interoperability in health care requires the close coordination and collaboration of various stakeholders, including patients, providers, software vendors, legislators, and health information technology (IT) professionals. Yet the U.S. health care delivery system continues to have a culture defined by silos, fragmented processes, and disparate stakeholders, and where data have become more of a commodity and competitive advantage than a basis for coordinated care.

Needless to say, there has been plenty of finger-pointing over interoperability issues. Both providers and vendors have been accused of “information blocking” or intentionally interfering with the flow of information between different EHR systems.<sup>12,13</sup>

In a survey of HIE leaders, 25% of respondents said that health systems routinely coerce providers to adopt and use certain EHR technology rather than simply make it possible to collaborate across these technologies.<sup>13</sup> In addition, they reported that hospitals and health systems selectively share patient health information or do not always share complete information. The perceived motivation was that by controlling patient referrals and having exclusive access to patient data, they could potentially improve their revenue and enhance their market dominance.<sup>13</sup>

In the same survey of HIE leaders, 50% of respondents said that EHR vendors also routinely engage in information-blocking practices, either by designing products with limited interoperability or by charging high fees for providing HIE capabilities. These software developers reportedly charge anywhere from \$5,000 to \$50,000 for EHR interfaces to connect to blood and pathology laboratories, hospitals, pharmacies, and other providers.<sup>13,14</sup>

In 2015, the Office of the National Coordinator for Health Information Technology (ONC) released a report to Congress

that provided anecdotal evidence of information blocking in the health care industry.<sup>15</sup> Partly in response to this report, at the end of 2016, the 21st Century Cures Act was passed, making it more difficult for providers and vendors to engage in this practice. Along with multiple provisions that address EHR meaningful use, the bipartisan legislation assigns penalties of up to \$1 million to technology developers, networks, and providers who engage in information blocking or “any other action that may inhibit the appropriate exchange, access, and use of electronic health information.”<sup>16</sup>

### MEANINGFUL USE ADDS TO PHYSICIAN BURDEN

Meaningful use incentives significantly helped boost EHR adoption among physicians but at the same time negatively impacted the physicians themselves, reducing efficiency, adding to their clerical burden, and increasing the risk of professional burnout.<sup>17</sup> A recent study found that physicians spend approximately 33% of their work hours performing direct clinical work and 49% completing clerical tasks and interfacing with the EHR. For every hour of clinical work, physicians spent two hours on clerical or EHR-related tasks.<sup>18</sup>

Physician burnout is a real concern that has even been deemed a public health crisis, with more than half of U.S. physicians now experiencing the condition.<sup>19</sup> And while physicians might agree that a well-designed EHR provides many benefits to both their practices and their patients, including reducing medical errors, they have felt burdened by both the technology and meaningful use regulations.<sup>20</sup>

“The policy has had unintended consequences,” says American Medical Association (AMA) President Andrew Gurman, MD. “Prescriptive design, use, and certification demands by the federal government have driven the design of EHRs to focus on CMS reporting requirements, largely ignoring the needs of physicians and patients.” In addition, he says, physicians are unfairly held accountable for technological failures that are often outside their control.

While the meaningful use program rewarded providers for adopting and demonstrating meaningful use of EHR systems, it also penalized those who failed to do either. Individual physicians and other eligible health care professionals each could receive up to \$44,000 in incentives, or up to \$63,750, depending upon when they began participating in the program.<sup>21</sup> Conversely, eligible professionals who failed to implement an EHR and/or demonstrate meaningful use were penalized—starting at 1% of Medicare Part B reimbursements and increasing each year to a maximum of 5%.

Each EHR system needs to be certified for every stage of meaningful use by the ONC Certification Program, and getting an EHR to achieve certification has proven to be a challenge for many providers. At the start of 2016, approximately 209,000 physicians were facing meaningful use penalties—almost one-quarter of the U.S. physician workforce. In 2017, more than 170,000 providers have faced penalties.<sup>22</sup>

### MEANINGFUL USE GETS A FACELIFT

In April 2016, in response to recommendations from the AMA and 86 other medical societies and state associations, CMS proposed easing some requirements for physicians under the Medicare Access and CHIP Reauthorization Act of

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2015 (MACRA), including allowing them to continue using the 2014 certified version of their EHR. In addition, as part of the proposed rule on the implementation of MACRA, the meaningful use incentive program was essentially folded into the Merit-Based Incentive Payment System (MIPS), effective January 1, 2017. (The new program does not affect hospitals or Medicaid providers because neither is mentioned in the MACRA law, and both continue to be subject to the current meaningful use program.)

“EHR adoption and use is better served by designing them in a way that speaks to patient and physician needs,” Dr. Gurman says. “We are encouraged by flexibility found in MACRA and certification improvements in the 21st Century Cures Act and are working with CMS and ONC to ensure their policies and programs respond to needs physicians face in everyday practice.”

### EHR ADOPTION IS UP, BUT COSTS REMAIN A BARRIER

Despite the potential for incentive payments, the financial costs of implementing EHRs remain a primary barrier to their adoption.<sup>23</sup> The Michigan Center for Effective IT Adoption estimates upfront and yearly costs for implementation range from \$15,000 to \$70,000 per provider, depending on whether server-based or Web-based deployment is selected. In addition, EHR systems often require many customized interfaces to make them interoperable with other providers and organizations.<sup>24</sup>

The landscape of the EHR market is continually evolving, with more affordable, cloud-based technology available, but many smaller practices still lack the resources and technical expertise to effectively implement EHRs. Some physicians see this as a digital divide between large hospital systems and small rural hospitals or physician practices that are struggling both financially and technologically.<sup>25</sup>

In a recent survey of small-practice physicians, respondents expressed concern about the financial impact of EHR upgrades, especially given trending practice issues such as physician shortages.<sup>24</sup> The physicians agreed that EHRs would reduce the number of patients seen per day, thereby reducing their revenue. Notably, their dominant concern was that the use of an EHR would reduce their focus on the patient and potentially cause physicians to miss medical conditions.<sup>26</sup>

For health care providers in solo practice settings, the financial costs of EHRs can be particularly challenging. Lucy Hornstein, MD, a solo family practitioner in Valley Forge, Pennsylvania, migrated to an EHR system in 2010. She ended up choosing Practice Fusion, a free cloud-based EHR system that she said was relatively simple in terms of setup, functionality, and usability. Practice Fusion, which targets small to midsize medical practices, generates revenue by displaying advertisements inside the EHR software.

As for meaningful use, Dr. Hornstein completed both the first and second stages but chose not to participate in the third, saying that the incentives were not enough to make it worth her time and effort. She is one of a growing number of physicians who have opted out of all or part of the meaningful use program, finding that the incentives may not actually be all that meaningful for their practice's bottom line. The average family physician, who receives about \$100,000 annually, could

lose up to \$10,000 in Medicare reimbursements by 2018. But for some physicians, the penalty is a small price to pay for not having to deal with requirements that they feel prevent them from delivering better patient care.

### INTEROPERABILITY REQUIRES INDUSTRY COLLABORATION

Along with providing recommendations to CMS for improving incentive programs, Dr. Gurman says the AMA is also working on a number of fronts with the EHR vendor community and other stakeholders to improve the usability and interoperability of these products. There are many uses for the clinical data contained within an EHR, he says, including valuable insights for direct patient care as well as research and population health.

In response to the previously mentioned study that found physicians spend nearly half their day entering data into EHRs and handling other administrative tasks, the AMA said poorly designed EHRs were part of the problem. Among the capabilities that vendors need to improve or develop, the AMA says, are reducing cognitive workload, facilitating digital and mobile patient engagement, and expediting user input into product design and post-implementation feedback.

“The AMA is focused on reducing and reimagining EHR use and design regulation,” Dr. Gurman says. “Until that is addressed, EHR vendors will continue to develop products that meet federal requirements rather than patient and physician needs.”

### VA ANNOUNCES NEXT-GENERATION EHR

For all health care stakeholders—from patients and physicians to software vendors and hospital systems—driving digital change often requires a major shift of organizational culture. There is probably no better example of this than the Department of Veterans Affairs (VA), the largest integrated health care system in the United States, which has relied on its homegrown EHR system known as VistA (Veterans Information Systems and Technology Architecture) for nearly 30 years. On June 5, 2017, the new Secretary of Veterans Affairs, David Shulkin, MD, announced that, after years of trying to modernize the system and years of urging by Congress, the VA would replace it with Cerner's MHS Genesis, the same commercial off-the-shelf product used by the Department of Defense (DoD).<sup>27</sup>

According to a VA spokesperson, VistA is currently operable with DoD's system, and the two agencies have been sharing ever-growing amounts of information with each other as far back as 2001. But like so many other health care providers, the VA admits that interoperability challenges still exist. While the department will adopt the same EHR as DoD, the VA system will have additional capabilities so it can achieve interoperability with its academic affiliates and community partners, many of whom use different IT platforms. The VA will also leverage some of the same architecture, tools, and processes that DoD is already using to secure and protect its own data.

According to Secretary Shulkin, the VA has already begun negotiating a detailed contract with Cerner. The new system will likely cost more than \$4 billion and could take up to 10 years to implement.



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## THE PATH TO EHR INTEROPERABILITY

Whether it's a solo practice, a rural hospital, or a massive health system such as the VA, EHR interoperability is a huge, complex, and ongoing undertaking in health care delivery, involving the interplay of a range of stakeholders both within and across care settings. And while physicians, hospital administrators, and other stakeholders in the health care community seem to support interoperability—believing it will improve patient care, reduce medical errors, and lower costs—it has yet to become a reality for most of them.

“The future of EHR and its ability to be an important tool in care coordination and team-based care will depend on the action taken by the EHR vendor industry and the federal government to ensure interoperability is a major focus,” Dr. Gurman says.

So, how long will it be before we achieve true interoperability? In its October 2015 report, “Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap,” the ONC predicted it would be 2021 to 2024 before the nation's health system achieves interoperability. But for this to happen, many barriers will need to be addressed, including physician dissatisfaction with EHRs, overregulation, and cost. The government will need to provide stronger incentives to both providers and EHR vendors to promote interoperability. And all health care stakeholders will need to be a part of the interoperability effort in order to break down health data silos and allow patient health information to be available across all settings of care.

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